Level 1 Validation Summary Notes

This document includes detailed notes about utility practices as reviewed during third-party level-one water audit validation.

This document is not a required submission to the California Department of Water Resources. It is meant to provide background and documentation of the validation process.

Call Information

Utility	Validator
Utility Name: City of Brea	Validator: Reinhard Sturm, Water Systems Optimization
Utility Participants: Brian Ingallinera, Environmental Service Coordinator Rudy Correa, Supervisor Rita Navarrette, Billing Department	Validator Qualifications: Water Audit Validator Certificate from the AWWA California Nevada Section
Call Date: 6/19/2018	

Validation Call Notes

Audit Input	Grade	Audit Input Notes	Data Validity Grade Notes
Volume from Own Sources	n/a	Source Meter Profile: n/a Derivation: n/a Notable Sub-System Differences: Comments:	Approximate Percent of Volume Metered: n/a. Approximate Percent Tested and/or Calibrated: n/a. Calibration Frequency: n/a. Volumetric Testing Frequency: n/a. Volumetric Testing Method: n/a. Comments: This system does not produce water, imports only. No potable wells.
Volume from Own Sources Master Meter and Supply Error Adjustment	n/a	Derivation: n/a. Change in Storage Considered: n/a. Notable Sub-System Differences: Comments: n/a.	Source Meter Read Method: n/a. Source Meter Read Frequency: n/a. Data Review Practices: n/a. Real-Time Storage Level Monitoring: n/a. Comments: n/a.

Water Imported	5	Import Meter Profile: 100% imports: 80% Cal Domestic, 20% MWDOC/Met. La Habra basin is for irrigation water only. 7 reservoirs. 3 interties with MWDOC, 3 with Cal Domestic. MWDOC meters are mag meters, Cal Domestic are mag and venturi. Derivation: Invoicing as well as daily manual reads. Notable Sub-System Differences: Comments: Water is imported from La Habra Basin, Cal Domestic, and MWDOC. La Habra Basin represents only 1% of imports, and that water is non-potable and used only for irrigation. 80% of water comes from Cal Domestic. There are three interties each monitored by a mag meter with Cal Domestic. Only one Cal Domestic intertie was used in 2017, but the other two interties could be used in emergency. There are 3 interties with MWDOC and each is monitored by a single meter. These meters are owned by Met and are a combination of mag and venturi meters. All three interties with MWDOC were used in 2017. All meters for all interties are on SCADA. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Approximate Percent of Volume Metered: 100% Approximate Percent Tested and/or Calibrated: ~80% Calibration Frequency: Within last 5 years but less than annually. Volumetric Testing Frequency: Within last 5 years but less than annually. Volumetric Testing Method: Volumetric displacement. Comments: Import volumes come from invoicing, but meters are read manually every day and compared to SCADA data daily. There is no monthly tabulation of comparison between invoice and monthly meter reads, but daily reads are taken and compared to invoices every month. The main Cal Domestic meter was tested in 2016 via volumetric comparison.
Water Imported Master Meter and Supply Error Adjustment	3	Derivation: No value provided. Error adjustment does not consider reservoir levels. Comments: No additional comments.	Import Meter Read Method: Manual and automatic logging. Import Meter Read Frequency: Continuous. Data Review Practices: Each business day. Comments: SCADA logs data automatically for all imports. Reservoir changes not considered.
Water Exported	n/a	Export Meter Profile: n/a. Notable Sub-System Differences: Comments: This system is imports only. Interties exist to export water, but they are not used unless in emergency.	Approximate Percent of Volume Metered: n/a. Approximate Percent Tested and/or Calibrated: n/a. Calibration Frequency: n/a. Volumetric Testing Frequency: n/a. Volumetric Testing Method: n/a. Comments: No additional comments.
Water Exported Master Meter and Supply Error Adjustment	n/a	Derivation: n/a. Comments: n/a.	Export Meter Read Method: n/a. Export Meter Read Frequency: n/a. Data Review Practices: n/a. Comments: n/a.

Billed Metered Authorized Consumption	7	Derivation: Billing reports based on monthly reads. Customer Meter Profile: Read Frequency: Monthly. Reading Technology: AMR. Age Profile: 10-15 years. Notable Sub-System Differences: Comments: Lag-time correction is not employed in input derivation. No raw water or recycled water is in the billing system. Only temporary construction meters are tested regularly. Small meters are sometimes tested upon request and a test of irrigation meters was conducted recently. In 2017, 50 meters were replaced and around 20 of those were tested. A meter change-out program is underway, aiming to replace small meters every 10-15 years. Large meters are being transitioned to ultrasonic meters. Input derivation from supporting documents confirmed. Exclusion of non-potable volumes confirmed.	Approximate Percent Metered: 100% Small Meter Testing Practices: None. Number of Small Meters Tested: Large Meter Testing Practices: None. Number of Large Meters Tested: General Replacement Practices: Upon failure only. Billing Data Review: Standard billing QC, plus review of volumes by use type each billing cycle. High/low report and trouble codes reviewed monthly. Comments: AMR data captured once a month.
Billed Unmetered Authorized Consumption	n/a	Profile: n/a. Derivation: n/a. Notable Sub-System Differences: Comments: n/a.	Policy for Metering Exemptions: n/a. Comments: n/a.
Unbilled Metered Authorized Consumption	9	Profile: City buildings. Derivation: n/a. Notable Sub-System Differences:	Policy for Billing Exemptions: City facilities are not charged for water. These accounts are read like other accounts, but not billed.
Unbilled Unmetered Authorized Consumption	5	Profile: Operational flushing and fire department usage. Comments: No additional comments.	Comments: Default grade applied.
Unauthorized Consumption	5	Notable Sub-System Differences: Comments: Default input applied.	Comments: Default grade applied.
Customer Metering Inaccuracies	4	Derivation: Estimate but refined by test data. Notable Sub-System Differences: Comments: No additional comments. *See BMAC comments regarding meter testing & replacement activities.	Customer Meter Testing: Limited (upon request AND some other problem meters). Customer Meter Replacement: Ongoing (proactive), aim to replace small meters every 10-15 year. Comments: Meter accuracy testing conducted for a small number of meters beyond requests.
Systematic Data Handling Errors	5	Comments: Default input applied.	Comments: Default grade applied.

Length of Mains	8	Derivation: Totaled from GIS based map. Hydrant Laterals Included: Yes. Comments: No additional comments.	Map Format: Digital. Asset Management Systems: New asset management system in development. Map Update Process: Asset management system tracks replacements of mains. Comments: No additional comments.
Number of Service Connections	7	Derivation: Meters are used as a proxy for number of service connections. Basis for Query: Meter ID - non-premise based. Comments: No additional comments.	Field Validation: Accomplished through normal meter reading processes. Estimate of Error: 2%. Comments: Includes active and inactive meters. To establish a new connection, a contractor purchases meter from Brea and installs it. Staff at Brea logs and inputs that new service connection into the billing system.
Average Operating Pressure	5	How Pressure is Maintained: Pump stations. Pressure Range: 70-80 psi Derivation: Inferred from observations of pressure readings in field or review of pressure measurements. Notable Sub-System Differences: Comments: 16 pressure zones. Very hilly terrain. Hydraulic model last calibrated in 2012.	Pressure Data Collection: Taken at the hydrants. Real-Time Monitoring: Real-time monitoring limited to reservoirs and pump stations. Hydraulic Model: One exists but has not been calibrated within the last 5 years. Comments: Model is updated and calibrated when water master plan is done. Another master plan update and calibration will likely occur within the next 1-2 years.
Annual Operating Cost	10	Derivation: From official financial reports. Method to Allocate to Sub-Systems: Comments: Confirmed costs limited to water only, and water debt service included.	Auditing Practices: Annually by a third-party CPA. Comments: No additional comments.
Customer Retail Unit Cost	8	Rate Structure: Tiered structure with different rates for customer classes Derivation: Weighted average based on consumption by each rate. Sewer charges are not based on water meter readings. Sewer revenues are not incorporated into calculation. Comments:	M36 Review: Weighted average composite of all rates. Input calculations have not been reviewed by an M36 water loss expert. Comments: Seven rate tiers with volumetric and weighted rates are aggregated to generate a composite weighted rate.
Variable Production Cost	5	Primary Costs: Import supply only. Secondary Costs: None currently included. Comments: No additional comments.	M36 Review: Primary costs only. Input calculations have not been reviewed by an M36 water loss expert. Comments: No additional comments.

Infrastructure & Water Loss Management Practices:

Infrastructure age profile: ~30-40 years old.

Infrastructure replacement policy (current, historic): Replacement based on age and breaks in area. 1-2% replacement per year.

Estimated main failures/year: 6 in 2017. Average between 10-20 per year. Estimated service failures/year: 5-7 in 2017.

Extent of proactive leakage management: None currently. Low leak system.

Other water loss management comments: Aggressive CIP program. Area replaced old pipe cast iron pipe with ductal iron. New plan to replace all pipe in another development in the next year. CIP plan for different areas in the next 2 years. Between 1-2% replacement per year.